Acute Anticholinergic Syndrome Following Ingestion of Angel's Trumpet Tea

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The Angel's Trumpet Tree, or nana honua *as it is called by Hawaiians,[1] is prized as an ornamental tree because of its large, fragrant, trumpet-shaped flowers. A young man developed an acute anticholinergic syndrome from ingesting a tea brewed from Angel's Trumpet Tree. Because the tree grows so readily in Hawaii, health care providers need to be aware of the clinical presentation and treatment of this unusual etiology of acute delirium.*

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Case History

A 19-year old man was brought to the emergency room at Tripler Army Medical Center at 11:30 am when his friends observed his confusion and repetitive cigarette-lighting behavior the morning following ingestion of tea made from a plant collected on the island of Hawaii. The plant was tentatively identified as a *Datura* species by the Poison Control Center from a verbal description of the plant after it was confiscated by the Military Police. Treatment was initiated based on this information. The plant was subsequently confirmed to be the Angel's Trumpet Tree by the University of Hawaii Botany Division.

The patient said he had consumed 12 ounces of a tea brewed from the Angel's Trumpet Tree over a 10-minute period at approximately 1:30 am on the day of admission. After 45 minutes, the patient noted emotional lability: happiness and dancing with Reggae music, anger with heavy metal music, and sadness and crying with slow dance music. He also complained of difficulty with coordination: spilling coffee, putting a cigarette to his cheek when he intended to put it into his mouth, inability to walk in a straight line; talking loudly; and having hallucinations about propeller blades. He was confused and disoriented. After several hours, he went home to sleep. He awoke at 6:30 am with headache, feeling warm and flushed,

cotton mouth, inability to focus his vision, stumbling while walking, and reaching for a cigarette that was not there. In the emergency room, he did not remember how he got to the hospital. Two other friends consumed a smaller quantity of the tea and did not report symptoms. The patient denied concurrent use of illicit drugs at the party.

The patient was given naloxone 2 mg intravenous pyelogram and 60 grams of charcoal in 60 ml of 20% sorbitol and was admitted to a telemetry ward for observation.

His past medical history was remarkable for a history of alcohol consumption, 5 drinks/week, cigarette use, 10 pack-years, and past illicit drug use: marijuana, lysergic acid diethylamide (LSD), and cocaine. His family history was positive for cancer, diabetes mellitus, and alcoholism,

On physical examination, the vital signs were blood pressure: 119/60; pulse: 50 bpm; respirations: 16; temperature: 98.4°F. He was a well-developed, well-nourished man with intermittent periods of confusion (wondering if his father had brought him to the hospital, but then realizing his father lived in Virginia and could not have done so) and restlessness (standing up anxiously several times but denying anything was wrong). His pupils were dilated at 7 mm with a sluggish constriction response to light (5 mm); mucous membranes were dry; bowel sounds were decreased; skin was dry and warm with flushing of the face and neck. The remainder of the physical examination was normal.

Blood chemistries, complete blood count, and urinalysis were normal. Blood alcohol was undetectable. Urine drug screen was negative. The EKG showed sinus bradycardia at 52 bpm.

The patient gradually improved and was discharged after 24 hours of observation. All symptoms except mild blurring of vision resolved. At discharge, the physical examination showed a pulse of 47 bpm, dilated pupils at 6 mm, and dry skin. Follow-up was arranged in the Tri-Services Alcohol Recovery Facility (TRI-SARF) and with his primary care physician.

Discussion

Due to the synthesis of atropine (*dl*-hyoscyamine) and scopolamine (*l*-hyoscine), several plant species in the genus *Datura* have long been used by humans for medicinal and hallucinogenic purposes.[2] The most well-known species in North America is *Datura stramonium* or jimsonweed. Two species are found in Hawaii, *D. arborea and D. candida,* the latter being the more common; both are known locally as the Angel's Trumpet Tree.[3]

Scopolamine is the principal active compound in all species of *Datura.*[2] The amount of scopolamine, atropine, and other minor alkaloids is similar among species. In the report published by Hall et al, the flower of *D. sauveolens,* a species included in the section *Brugmansia* with *D. candida*, contained approximately 0.20 mg of atropine and 0.65 mg of scopolamine.[4]

The symptoms and signs of *Datura* intoxication are due to competition by scopolamine and atropine with acetylcholine for a common binding site on muscarinic receptors located in exocrine glands, smooth and cardiac muscle, ganglia, intramural neurons, and the central nervous system. As such, they are known as muscarinic cholinergic blocking agents. When humans are exposed to graded doses of atropine, the constellation of organ manifestations occur in a predictable hierarchy: blockade of sweat, salivary, and bronchial gland secretion; mydriasis, loss of accommodation, and tachycardia; inhibition of micturation, and decreased tone and motility of the gastrointestinal tract; and impaired gastric acid secretion and motility.[5] The central nervous system effects of toxic doses of atropine include restlessness, irritability, disorientation, hallucinations, or delirium. In severe cases, coma, paralysis, respiratory failure, circulatory collapse, and death can occur. Due to greater permeation of the blood-brain barrier, central nervous system effects are seen with therapeutic doses of scopolamine; these include drowsiness, memory loss, fatigue, and euphoria. Higher doses of scopolamine produce similar central nervous system effects as atropine. The following metaphor has been taught to generations of clinicians to help them remember this clinical syndrome: "Hot as a hare, blind as a bat, dry as a bone, red as a beet, and mad as a hatter."

The clinical presentation of the patient in this case report is consistent with other studies and illustrates several differences in the pharmacology of scopolamine as compared to atropine. The symptoms of feeling warm and flushed, headache, xerostomia, and blurred vision, and the signs of mydriasis, sluggish and incomplete pupillary constriction to light, dry mucous membranes, decreased bowel sounds, warm, dry skin, and flushing of the face and neck are all explained by peripheral muscarinic receptor blockade. The occurrence of severe central nervous system signs and symptoms of emotional lability, incoordination, hallucinations about propeller blades, restlessness, confusion, and disorientation with peripheral manifestations confirm chemical analyses demonstrating scopolamine to be the principal agent. The presence of bradycardia, an unusual feature of an anticholinergic syndrome, can be explained by the effect of scopolamine on MI receptors of postganglionic parasympathetic neurons, thus abolishing the inhibitory effect of synaptic acetylcholine on neurotransmitter release.[5] The persistence of blurred vision at hospital discharge demonstrates the effect of atropine and scopolamine to cause prolonged impairment of pupillary and accommodation reflexes; full recovery may not occur for 7 to 12 days.

The treatment of cases of *Datura* intoxication is primarily supportive. Due to impaired peristalsis, all candidates considered for hospitalization should be given activated charcoal to limit absorption. Physostigmine, 1 mg to 4 mg, given by slow intravenous injection rapidly abolishes the systemic effects of anticholinergic drugs.[6] Due to the short half-life of physostigmine, the dose may have to be repeated every 1 to 2 hours in symptomatic patients.

While the acute anticholinergic syndrome is uncommon, the diagnosis is usually made by the astute clinician on the basis of the constellation of patient signs and symptoms. Treatment is easily administered and complete recovery is the rule. Recent reports underscore the potential for intentional misuse and accidental poisoning from *Datura* species.[7-8] Emergency room and primary care physicians in Hawaii need to be aware of the similar potential with the ornamental Angel's Trumpet Tree.

References

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